425 Chestnut Street • P.O. Box 217 • Bally, PA 19503-0217
(610) 845-2351 • Fax (610) 845-2023

March 16, 2007

U.S. EPA, Region III
Mail Code 3HS22
1650 Arch Street
Philadelphia, PA 19103

Attn: Mitch Cron, RPM

Re: Bally Ground Water Contamination Superfund Site
EPA ID# PAD061105128
Borough of Bally, Berks County, PA
Proposed Remedial Action Plan (Operable Unit 2)

Dear Mr. Cron:

The Borough of Bally provides this letter as written comment to the Proposed Plan as referenced above.

- **Alternate 1 – No action Alternate.** This alternate is not acceptable to the Borough as not protective of the human health of the users of the municipal water supply.
- **Alternate 2 – Installation of New Municipal Supply Well.** The Borough of Bally prefers this proposed alternate with consideration of the other comments within this letter.
- **Alternate 3 – Additional treatment of current Municipal Supply Well.** This alternate is not acceptable to the Borough. Due to historical consumption of contaminants of this water supply, further treatment creating known and unknown by products continue to create a supply of water not protective to human health.
- **Proposed New Municipal Supply Well**
  - The quality of this water shall continue to be protected by the EPA and Pennsylvania Department of Environmental Protection. The PRP shall continue to be responsible for all costs to ensure this protection, and in the event of production of non potable water, be required to provide a new source of water. **This should be stated in the amended ROD**.
  - The quantity of water from the new municipal well shall be permitted at no less than 300 gpm and **should be so stated in the amended ROD**.

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- The proposed alternate, i.e., the new municipal supply well, should be completed immediately. The amended ROD should include a compliance schedule to complete the construction of the new municipal well.
  - The proposed well should be completed and on line within one year, by March 2008.

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- Continued progress on construction of the proposed new municipal well should not be conditional on any other aspects of the Superfund Cleanup.
- The completion of the proposed new municipal well in March 2008 would be five (5) years since 1,4-dioxane was confirmed present in Well 3.

  - The Surface Water Infiltration Protocol (SWIP) testing shall be completed by the PRP with a Pennsylvania Department of Environmental Protection determination of the "not under the influence of surface water".

- **Redundancy** – Prior to the VOC contamination of the aquifer, the Borough had redundant wells, MW#1 and MW#3.
  - The proposed plan does not provide redundancy.
  - As a minimum, the PRP shall provide a permanent emergency power source (generator) to provide emergency service in case of power loss.
  - A manual transfer switch with a generator to be brought on site in an emergency is not acceptable.
  - The Borough will not accept dedication of the proposed new municipal well without the permanent emergency generator.
- **Contingency Plan** – The contingency plan to determine corrective actions in the event of migration of the ground water contamination plume should be completed during the construction of the proposed new municipal well.
- **Pennsylvania Department of Environmental Protection** – The PRP shall ensure that the proposed new well meets or exceeds all applicable Safe Drinking Water Act requirements.

Respectfully Submitted
Bally Borough Council

Leo D. Mutter
Council President

Cc: Systems Design Engineering, Inc.
Jeffrey Karver, Esq.
Michael Dietrich, Superintendent
Susan Werner, DEP

III. SOURCE DEVELOPMENT AND CONSTRUCTION

A. General

Each system should maintain more than one source of supply. This may be accomplished by a combination of groundwater and/or surface water sources, or through interconnections with other systems. However, it is DEP's policy to require the use of the best available source(s) of supply with respect to both quantity and quality, taking into consideration the current technology in water treatment needed to provide a safe and potable water for human consumption. In selecting the source or sources of water to be developed, the designing engineer, and geologist, where appropriate, must prove, to the satisfaction of DEP, that an adequate quantity of water will be available and that the water which is to be delivered to the consumers will consistently meet the drinking water standards of DEP.

B. Sampling and Analysis of Proposed Sources

One of the prerequisites for achieving a sound water supply system is a thorough water quality monitoring program. This includes collecting and analyzing a sufficient number of water samples to be able to predict the source water quality under various flow and weather conditions.

1. Sampling Requirements

The minimum number of sample analyses to be performed for each water quality parameter depends on the source. The following DEP technical guidance documents provide the minimum sampling requirements:

New Source Sampling Requirements for Surface Water Sources, DEP ID: 383-3130-108 available on DEP's website

Community and Nontransient Noncommunity Water Systems: New Source Sampling Requirements for Groundwater Sources, DEP ID: 383-3130-208 available on DEP's website

Additional sampling should be considered for those sources that are subject to a high degree of variability. DEP may require that additional sampling be performed depending on source characteristics.

For source types that require more than one round of sampling, the samples should be taken under various meteorological and hydrological conditions. A brief description of the conditions that exist at the time of the sampling (e.g., relative stream flow, amount of recent rainfall, temperature, etc.) shall be provided to DEP with the sample results.

a. Surface Water Sources

Three sets of samples shall be taken for each parameter listed in the *New Source Sampling Requirements for Surface Water Sources*. Sample collection should be spaced such that high, average and low stream flows will be evaluated. Samples shall be taken over a minimum time interval of 6 months and preferably 1 year.

b. Groundwater Sources

At least one set of samples shall be collected at the termination of the aquifer test for the parameters listed in the technical guidance document *Community and Nontransient Noncommunity Water Systems: New Source Sampling Requirements for Groundwater Sources*. Applicants or their consultant must notify Water Supply Management's regional technical services section at least 2 weeks prior to starting the aquifer test. Applicants are further advised to contact their respective river basin commission to verify the length of the aquifer test.

c. Spring Sources, Infiltration Galleries, Ranney Wells

Sampling shall be spaced over a minimum of 1 year, and include the following:

(1) Testing for all required water quality parameters for groundwater. Two sets of samples must be taken, and include both high flow and low flow periods.

(2) Daily spring discharge (in gallons per day) and daily precipitation (to tenths of an inch) for 1 year.

(3) A minimum of 6 months of monitoring according SWIP. A monitoring plan must be approved before data collection.

(4) Additional testing may be required.

d. Karst Sources

If the groundwater source draws from a karst aquifer, dye trace studies may be required since they are the most appropriate method for determining hydrogeologic characteristics.

e. Finished Water Sources

For radionuclides, Volatile Organic Compounds (VOCs), Synthetic Organic Chemicals (SOCs) and Inorganic Compounds (IOCs), the applicant may submit the most recent results of analyses obtained from the selling water system provided the analyses were conducted within the appropriate monitoring schedule and conducted by a DEP-certified

laboratory. However, the applicant must provide for their own sampling and analysis of turbidity, total coliforms and total trihalomethanes.

f. Sample Collection

In order to achieve reliable results, proper collection, preparation and storage of the water samples and use of proper sample collecting equipment and techniques is critical. For this reason, water samples shall be collected by a person properly trained by a laboratory certified by DEP for the parameters being tested. For example, the person collecting the VOC sample would require proper training from the lab performing the VOC sample.

2. Sample Analysis

Contact the Bureau of Water Standards and Facility Regulation, P.O. Box 8467, Harrisburg, PA 17105-8467 or your regional office (see Table 1.1) for the current list of DEP's Maximum Contaminant Levels (MCL). Other parameters which a sanitary survey may determine as having a potentially adverse impact on the quality of raw water also should be included in the analyses.

a. Laboratories

All analyses must be performed by a laboratory certified by DEP, except for those that may be performed by a person meeting the requirements of Title 25 Pa. Code §109.704.

C. Surface Water Sources

Surface water sources are defined as all water open to the atmosphere or subject to surface runoff, or sources which are directly influenced by surface water, which may include springs, infiltration galleries, cribs or wells. The term excludes finished water.

Direct influence by surface water may be determined on a case-by-case basis. Direct influence may be indicated by:

- Significant and relatively rapid shifts in water characteristics such as turbidity, temperature, conductivity or pH (which also may change in groundwater but at a much slower rate) which closely correlate to climatological or surface water conditions.

- The presence of insects or other microorganisms, algae, organic debris or large-diameter pathogens such as *Giardia lamblia* as determined by a microscopic particulate analysis.

Where surface water sources are proposed to be used as a source of drinking water, a water allocation permit must be obtained from DEP. Applicants are advised to obtain the water allocation permit prior to preparation of plans and specifications.

1. Source Quantity

The quantity of water at the source shall:

a. Be adequate to meet the maximum projected water demand of the service area as shown by calculations based on a one in 50-year drought or the extreme drought of record, and should include consideration of multiple year droughts.

b. Provide a reasonable surplus for anticipated growth.

c. Be adequate to compensate for all losses such as silting, evaporation, seepage, etc.

d. Be adequate to provide ample water for other legal users of the source.

Where water is drawn from an impounding reservoir or lake, the yield of the reservoir or lake should exceed the estimated future average daily demands for the critical duration of a drought having a recurrence interval of 50 years. Allowances should be made for required water releases, evaporation, seepage and siltation losses.

2. Source Quality

A sanitary survey and study shall be made of the factors, both natural and manmade, which will affect the quality of the water at the source. The results of the sanitary survey shall be submitted to DEP. Such survey and study shall include, but not be limited to:

a. Obtaining samples over a sufficient period of time to assess the bacteriological, physical, chemical and radiological characteristics of the water.

b. Determining future uses and effects of impoundments or reservoirs.

c. Determining the degree of control over the watershed that can be exercised by the owner.

d. Assessing the degree of hazard or vulnerability to the supply by agricultural, recreational and residential activities in the watershed, and by accidental or deliberate spillage of materials that may be toxic, harmful or detrimental to treatment processes.

3. Structures

a. Intakes

Intake structures shall:

(1) Be designed to handle the maximum anticipated daily demand with due consideration to operation under minimum head conditions throughout the design period.

(2) Shall be protected by at least two sets of removable, stationary screens, or by a traveling screen. Screen openings shall be small enough to exclude all matter which will clog.

(3) Have protection against clogging by sediment, debris or ice, and against damage due to wave action and flotation.

(4) Have a velocity of flow through the inlet structure such that frazil ice will be held to a minimum, generally not to exceed 0.5 feet per second.

(5) Have inspection manholes every 1,000 feet for pipe sizes large enough to have visual inspections.

(6) Be able to withdraw water from more than one level if quality varies with depth.

(7) Have separate facilities for release of less desirable water held in storage.

(8) Be accessible during adverse weather conditions.

b. Raw Water Pumping Wells

Raw water pumping well intakes shall:

(1) Have motors and electrical controls located above grade and preferably above the 100-year flood level.

(2) Be accessible during all adverse weather conditions.

(3) Be designed against flotation.

(4) Be equipped with removable or traveling screens before pump suction well.

(5) Provide for introduction of chlorine or other chemicals in the raw water transmission main if necessary for quality control.

(6) Have intake valves and provisions for backflushing or cleaning by a mechanical device and testing for leaks where practical.

(7) Have provisions for withstanding surges where necessary.

4. Impoundments and Reservoirs

a. Site Selection

Site selection shall give consideration to:

(1) Topography and geology.

(2) Storage capacity required.

(3) Safety.

(4) Water rights.

(5) Raw water characteristics.

(6) Proximity to sources of pollution.

(7) Accessibility during adverse weather conditions.

b. Site Preparation

Site preparation shall provide:

(1) Removal of brush and trees to a level of 10 feet above the anticipated high water elevation.

(2) Protection from floods during construction.

c. Site Construction

Where earth disturbance will occur, an Erosion Control Plan must be developed and retained at the construction site for the duration of the earth moving activities.

D. Groundwater Sources

The total developed source capacity should equal or exceed the design maximum day demand and equal or exceed the design average day demand with the largest producing source out-of-service. Groundwater includes all water from dug, drilled, bored, jetted or driven wells; infiltration galleries; or springs. Groundwater sources that are directly influenced by surface water are classified as surface sources and will require treatment as a surface source.

1. Aquifer Testing

a. Purpose

In accordance with Title 25 Pa. Code §109.503(a)(1)(iii)(C), a properly designed constant-rate (also referred to as constant-discharge) aquifer test shall be conducted on any well proposed as a new source in order to adequately define the hydraulic characteristics of the aquifer and well. Data from the test shall be subject to appropriate analysis to demonstrate the suitability of the well as a long-term source of public drinking water including, when necessary, the evaluation of significant potential impacts from the groundwater withdrawal. The analysis and interpretation of the test shall be performed by a professional geologist licensed in the Commonwealth of Pennsylvania as a component of the hydrogeologic report described in Section III.D.2. The results derived from properly conducted and analyzed aquifer tests will also provide water suppliers with the data necessary to support informed decision making on water supply management and planning issues.

As provided in the regulations, these procedures may be altered at the discretion of DEP for wells or wellfields that will be pumping less than 100,000 gallons per day. For water supply systems proposing to withdraw greater than 100,000 gallons per day, appropriate River Basin Commission regulations may also apply.

b. Design

Proper design implies that sufficient planning is undertaken to ensure that the test will provide acceptable results for the anticipated site conditions. A conceptual understanding of the hydrogeologic setting of the site is required to design and interpret aquifer test results. Information necessary to develop a conceptual model includes the lithology, depth, thickness, position, extent and structural trends of the water-bearing formations and confining strata; nature and location of hydrologic boundaries; and the regional hydrogeologic framework. Evaluation of impacts on other water resources from the proposed withdrawal must also be factored into the design of the test.

c. Observation Points

In order to allow data analysis by time-drawdown and distance-drawdown methods, the use of appropriate observation wells is required for aquifer tests. An observation point may be an existing well with appropriate construction that is not being pumped during the aquifer test or a well constructed for the sole purpose of obtaining water level measurements.

At least two observation points are required, although it is strongly recommended that a minimum of three be used as this will generally provide a more representative test and result in a better final analysis.

Situations involving vertical leakage, hydrogeologic boundaries or withdrawal impacts may warrant the use of more. The observation points should generally have screened or open intervals similar to the production well. If hydraulic connection between different formations is a concern, there should also be observation points that are screened above or below the producing aquifer as appropriate.

Observation points should be located at increasing distances from the pumping well so that at least one logarithmic cycle of distance-drawdown data is provided. A typical spacing would be approximately 100, 400 and 1,000 feet from the production well. Alignment will generally vary depending on the location of boundaries and type of aquifer. Actual distances and orientation of observation points relative to the production well may be constrained by topographic limitations or land availability. In anisotropic aquifers, no two observation points should be radially aligned with the pumping well.

The effect of withdrawal on nearby wells, springs, wetlands, streams or other surface or subsurface water features should also be monitored. As appropriate, water levels in wells should be monitored and any available information (owner, construction details, depth, diameter, geology etc.) should be included. Surface waterbodies with no outflow such as ponds and wetlands should be monitored via staff gages or piezometers. A piezometer may be installed adjacent to the surface waterbody being monitored, if the screened interval is representative of the material underlying the surface waterbody. Surface waterbodies with outflow such as streams, ponds or wetlands should be monitored in both the upstream and downstream directions via weirs, flumes, stilling wells and/or piezometers. Spring flow or stage should be monitored utilizing weirs, flumes and piezometers to characterize the hydrogeologic effect of withdrawal.

d. Testing Procedures

A successful aquifer test requires knowledge of the antecedent water level trend, a carefully controlled constant pumping rate and accurate measurements of water levels in the production well and observation points at appropriate time intervals during both drawdown and recovery periods.

The test should be scheduled to avoid heavy rain events or subsequent rapid changes in water table elevation. Two-week advance notification must be given to DEP to allow the scheduling of water quality samples and a microscopic particulate analysis at the termination of the test.

Adequate planning and design shall allow for the constant-rate aquifer test to be conducted on a properly constructed and developed production well according to these procedures:

(1) Prior to the test, background water level measurements shall be taken from the production well, all observation points and other water resources of concern at 3-hour intervals over at least a 72-hour period to establish natural water level trends. If possible, the effects from other pumping wells in the area should be controlled by having them turned off or by maintaining the pumping at a constant rate during the test. Especially for confined aquifers, antecedent barometric pressure should also be recorded, preferably on-site at the same frequency as the water levels.

(2) A step-drawdown test and analysis shall be performed to determine a sustainable pumping rate for the aquifer test. There should be at least 3 successive equal stages of increased pumping. At each step, the pumping rate is held constant generally for 1 hour to assess drawdown response. The pumping rate is increased at a constant fraction (e.g., increments of one-third for 3 steps) with the last step having a rate equal to the desired production rate. Drawdown in the pumping well should be recorded every 5 minutes during each step. When a step-drawdown test is performed prior to the aquifer test, water levels must be allowed to recover to at least 90 percent of the original pre-pumping level. The constant-rate aquifer test may not be a continuation of the last step of the step-drawdown test.

(3) The production well shall be pumped at the rate indicated by the step-drawdown test and discharge must be kept within 5 percent of the constant rate. The well will not be permitted for a pumping rate greater than the sustainable constant rate. The discharge rate must be checked frequently at the beginning of the test and periodically throughout the test. Significant variations in pumping rates may be grounds for rejecting the results of an aquifer test. The discharge must be conveyed away from the pumping well, observation wells and other monitoring points to prevent artificial recharge of the aquifer. Proper erosion and sedimentation controls shall be utilized and any necessary discharge approvals shall be obtained prior to pumping.

(4) Barometric pressure and any precipitation amounts should be recorded on-site at a frequency of every 3 hours beginning 72 hours before the test and throughout the test and recovery period. Any changes in these measurements should be factored into the aquifer drawdown data analysis.

(5) Water levels in the production well and all observation points shall be accurately measured to the nearest 0.01 foot. Drawdown shall be reported in decimal feet. More frequent measurements are critical during the early part of the test as water levels generally decline rapidly. A sample 48-hour *Constant Rate Aquifer Test Data Form* (3800-FM-WSFR0087) and *Aquifer Test Recovery*

Data Form (3800-FM-WSFR0088) should be used to provide the raw data from the test. These forms are available on DEP's website. If automated recording devices are used, manual measurements should be performed occasionally as a check and to provide backup measurements in the event of equipment malfunctions. Loss of data from recording system malfunctions and no backup measurements may be grounds for rejecting the results of an aquifer test. For other water resources of concern such as wetlands, ponds and streams, water levels or flows shall be recorded at least every 3 hours throughout the test or as pre-approved by DEP.

Table 3.1

Frequency of Water Level Measurements for the Production Well and Observation Points During an Aquifer Test

Time Since Pumping Started	Time Between Measurements
0-10 minutes	1 minute
10-30 minutes	5 minutes
30 minutes-1 hour	10 minutes
1-6 hours	30 minutes
6-24 hours	1 hour
24 hours-termination	2 hours

(6) The duration of the aquifer test for confined aquifers shall be a minimum of 48 hours if sufficient information is available prior to the test to demonstrate the aquifer is confined. Boundary conditions may require additional monitoring. For unconfined aquifers (such as most fractured-bedrock aquifers), the length of the aquifer test will be a minimum of 48 hours. A longer test may be required to evaluate aquifer boundary conditions and well capabilities, as well as potential impacts to existing water supplies and the environment. All tests should be continued until drawdown has relatively stabilized.

(7) At the conclusion of the aquifer test, water samples shall be collected from the production well for chemical analysis in accordance with DEP's New Source Sampling requirements. Also, a Microscopic Particulate Analysis (MPA) may be required if surface water identification protocol criteria is met.

(8) After termination of the test, water level recovery in the production well and observation points shall be recorded on the *Aquifer Test Recovery Data Form*, using the same frequency for drawdown measurements, with the time that pumping stops as the starting time. For other water resources of concern, water levels or flows

shall be recorded every 3 hours. The recovery period must be monitored for at least 24 hours or until water levels have recovered by 90 percent, whichever is longer.

e. Analysis and Interpretation

Various methods for the analysis of aquifer tests are available and are discussed in numerous textbooks and other publications. The selection of a method to analyze the data and subsequently interpret the results requires an understanding of the hydrogeologic system and the underlying assumptions of the analytical method. The analysis and interpretation of an aquifer test shall be performed by a professional geologist licensed by the Commonwealth of Pennsylvania. The components of the hydrogeologic report are described in Section III.D.2. The analysis and interpretation of aquifer test data shall include:

(1) All data collected during the aquifer test. Include pre-test, drawdown and recovery phases for the production well and all observation points. As appropriate, drawdown and recovery data should be corrected to compensate for any significant external influences (barometric pressure, tides, etc.).

(2) Plots of step test-drawdown (semi-log), time-drawdown (log-log and semi-log), distance-drawdown (semi-log), time-recovery (semi-log) and any other relevant plots, including a copy of any type curves and match points that are used in the analysis. Log-log plots utilizing dimensionless drawdown and time (W(u) and 1/u) must also be plotted in terms of time and drawdown.

(3) Determination of aquifer transmissivity and storage coefficient using a method best suited for the conceptual model of the site. Evaluation of the data using several methods may be necessary. The analysis should include method selected, justification of the method and how well the assumptions implicit to that method apply. Apparent boundary effects should also be identified and discussed. Equations used (including units) and calculations must be provided. Analysis of recovery data should not be overlooked as it can provide a check on the results obtained from the pumping data.

(4) Determination of the hydraulic conductivity, specific capacity and estimation of the zone of influence (horizontal extent of the cone of depression). Various analytical methods are available to calculate the radius of influence based on certain aquifer assumptions. The Jacobs distance-drawdown method is one example.

(5) Determination of a dependable yield for the well by considering the drawdown at observation points, available drawdown for the

production well, natural recharge/discharge, any well interference effects, impacts on other water resources and the hydraulic characteristics of the aquifer system. The analysis shall include the effects of 180 days of pumping with no recharge as a severe drought scenario. For complex situations involving potential impacts on other water resources, groundwater modeling should be considered.

(6) The extent of impact and how these impacts will be mitigated or remediated if impacts are noted at observation points.

2. Hydrogeologic Report

A hydrogeologic report, signed and sealed by a professional geologist licensed in the Commonwealth of Pennsylvania, should contain the following information on each proposed source:

a. Geologic setting or conceptual model of the project area with emphasis on hydrogeologic aspects (supply appropriate citations if taken from published literature.)

b. Stratigraphic log for each well drilled, identifying the following:

(1) Lithology, color, minerals, grain size and shape, sorting, nature of contact, fractures and other structural features, etc.

(2) All formation changes

(3) All water-bearing zones and associated yields

(4) Static water level

c. As-built cross section for each well, that shows:

(1) Type, size, weight and depth of all casing(s)

(2) Drive shoes and casing centralizers

(3) Amount, type and depth of grout

(4) Screened intervals/gravel pack

(5) Static water level and date measured

(6) Depth of production pump setting

(7) All water-bearing zones and associated yields

d. A copy of the completed Water Well Inventory Report.

e. Aquifer Test

The length of the aquifer test will be a minimum of 48 hours. A longer test may be required to evaluate aquifer and well capabilities, as well as potential impacts to existing water supplies and the environment. Aquifer characteristics should be determined using time and distance-drawdown methods, along with appropriate justification and discussion. Include:

(1) Pre-pumping static water level.

(2) Depth of test pump setting.

(3) Starting and ending time of test cycle.

(4) Pumping rate.

(5) Step-drawdown data and graph.

(6) Time-drawdown curves for production well and observation points.

(7) Time-recovery curves for production well and observation points.

(8) Residual drawdown vs. t/t' recovery analysis.

(9) Raw drawdown and recovery data from the production well and all observation points. Include time since pumping began (in minutes), water elevations (from below ground level), drawdown (in feet and tenths) and discharge (in gpm).

(10) Distance-drawdown curves using data from a minimum of two observation points.

(11) Precipitation events noted on each curve.

(12) Identification and explanation of irregularities, abrupt slope changes, etc. in graphs.

f. Aquifer characteristics - **show equations used and calculations.**

(1) Hydraulic conductivity

(2) Transmissivity

(3) Storage coefficient

(4) Specific capacity

g. Dependable source yield with justification.

h. Any other information that describes the hydraulic characteristics of the aquifer and demonstrates the suitability of the proposed source.

i. Proof of the supplier's ability to control the Zone I wellhead protection area.

j. Spring Information

The following information is required for springs:

(1) Geological information

(a) Results of discharge and sampling studies

(b) Topographic map of contributing watershed

(c) Description of the vertical and horizontal extent of the source aquifer

(d) Formation name

(e) Spring type (i.e., diffuse vs. conduit flow; seepage, fracture, tubular, ebbing and flowing) including justification/observations

(f) Physical characteristics of spring and immediate surroundings

(2) Construction details should include:

(a) Interception and collection systems.

(b) Diversion structures at spring discharge.

(c) Construction materials and their placement.

(d) Overflow piping.

(e) Surface water diversion structures.

(f) Cleanout drain.

(g) Access to collection system.

(h) Surface catchment and intake structures.

k. Sample Results

Include the following sampling results:

(1) New source sampling for each production source

(2) Microscopic particulate analysis, if applicable

(3) Any other additional sampling, such as dye trace results, stream monitoring, SWIP monitoring, etc.

l. Discussion of other applicable permits or approvals which may be required (Include proof of resolution of PNDI conflicts.)

m. A description of potential impacts that using the new source will, or could have, on adjacent wetlands, surface waterbodies, private or public wells, springs or other adjacent surface and subsurface water features. Discuss how the new source is hydraulically connected to the impacted feature, the anticipated extent of impact, and any proposed remediation or mitigation. The discussion must meet the requirements of DEP's *Screening Criteria on Water Quality/Quantity Impacts for Drinking Water Permits*, DEP ID: 383-2131-001, available on DEP's website.

3. General Well Construction

a. Plumbness and Alignment

Every well shall be tested for plumbness and alignment in accordance with AWWA's Standard A100 for Water Wells. The test method and allowable tolerances shall be clearly stated in the specifications.

As a minimum, a 40-foot section of pipe or rigid dummy of the same length, having an outside diameter of not more than 0.5 inch less than the inside diameter of the well casing or hole being tested, should move freely throughout the length of the well casing or hole to the lowest anticipated pump setting.

b. Minimum Protected Depths

All drinking water supply wells and observation wells shall be constructed to be watertight to such depths as may be necessary to exclude pollution from surface runoff and from polluted aquifers above the aquifer being used as a source of supply. In consolidated rock formations, if steel casing is used, the casing shall be equipped with a drive shoe and seated by driving it into the surface of the consolidated formation until a seal is obtained. If nonferrous casing is used, it must be seated into the rock for a length of at least 5 feet (1.5 meters), and must be cemented in place. In unconsolidated formations, the permanent casing and grout shall extend at least 50 feet below original or final ground elevation, whichever is lower.